WHAT IS CLAIMED IS:

1. An ink jet recording head structure comprising:

an ink jet recording head comprising a flow passage member provided with a plurality of ink chambers and pressurizing mechanisms for pressurizing ink in respective ink chambers, and a nozzle plate having ink discharge holes communicating with said ink chambers; and

a support member comprising ceramics that has ink delivery holes communicating with the ink chambers of said flow passage member and supports said ink jet recording head,

wherein said ink delivery hole has the elongated hole having the inclined bottom surface that opens on the ink jet recording head side and deepens toward the center, and a small-diameter hole that communicates with said elongated hole, and

surface roughness of at least the inclined bottom surface of said ink delivery hole is from 0.4 to 1.0 μ m in terms of arithmetic mean roughness (Ra) and void ratio is in a range from 5 to 30%.

2. The ink jet recording head structure according to claim 1, wherein said inclined bottom surface is the surface as sintered.

3. The ink jet recording head structure according to claim 1, wherein said inclined bottom surface is subjected to an annealing treatment.

4. An ink jet printer that employs the ink jet recording head structure according to claim 1.

5. An ink jet printer comprising the ink jet recording head structure according to claim 1,

paper feeding means for supplying printing medium to the ink jet recording head structure, and paper discharging means for discharging the printing medium that has been printed by the ink jet recording head structure.

6 A method of powder molding for molding a ceramic compact that has a through hole of different diameters, which comprises the steps of:

inserting a part of a stationary punch into a first through hole of a die and inserting a part of a floating punch into a second through hole of said stationary punch thereby to form a stepped recess by means of the die, the stationary punch and the floating punch;

filling the stepped recess with a ceramic material powder;

lifting said floating punch so as to cause a protruding portion provided at the tip thereof to protrude above the ceramic material powder;

lowering said upper punch so as to insert the protruding portion of said floating punch into the recess or a third through hole of the upper punch;

lowering the upper punch so as to apply pressure to the ceramic material powder and forcibly lower said floating punch at a time just before the end of compression; and

lowering said upper punch to the compression ending position after lowering the floating punch, so as to form the ceramic compact that has the through hole of different diameters.

7. The powder molding method according to claim 6, wherein the floating punch has a tapered face and a protruding portion at the distal end thereof which is inserted into the second through hole of the stationary punch.

8. The powder molding method according to claim 7, wherein said tapered face and said

protruding portion have surface roughness of 0.05 or less in terms of arithmetic surface roughness (Ra).

9. A powder molding press apparatus comprising:

a die having a first through hole;

a stationary punch that is inserted into the first through hole of said die and has a second through hole;

a floating punch that is inserted into the second through hole of said stationary punch and has a protruding portion at the distal end thereof; and

an upper punch that is inserted into the first through hole of said die and has a recess or a third through hole in which the protruding portion of the floating punch is inserted.

10. The powder molding press apparatus according to claim 9, wherein the floating punch has a tapered face and a protruding portion at the distal end thereof which is inserted into the second through hole of the stationary punch.

11. The powder molding method according to claim 10, wherein said tapered face and said protruding portion have surface roughness of 0.05 or less in terms of arithmetic surface roughness (Ra).

12. A method of manufacturing a support member of an ink jet recording head structure, which comprises sintering the ceramic compact provided with the through hole of different diameters formed by the powder molding method according to claim 6.

13. A method of manufacturing a support member of an ink jet recording head structure, which comprises sintering the ceramic compact formed by the powder molding method according to claim 6 to obtain the support member that has an elongated hole having an inclined bottom surface and a small-diameter hole that communicates with said elongated hole.